

NATURAL GAS GENERATOR SET: 125KW STANDBY POWER UNIT

NOTE: THIS SPECIFICATION AND ANY ACCOMPANYING SPECIFICATION OR BID CAN BE APPEALED.

YOUR SPECIFICATION OR BID APPEAL MUST BE SUBMITTED IN WRITING TO THE CITY PURCHASING DIRECTOR **NO LATER THAN FIVE (5) WORKING DAYS PRIOR TO BID OPENING.**

YOUR SPECIFICATION OR BID APPEAL MUST NOT ONLY IDENTIFY THE PROVISION, TERM OR CONDITION THAT IS CAUSING PROBLEMS, BUT ALSO YOUR PROPOSED ALTERNATE PROVISION, TERM OR CONDITION AND BE SUPPORTED BY TECHNICAL DATA, TEST RESULTS AND OTHER INFORMATION.

CONTACT THE APPROPRIATE PURCHASING AGENT OR THE PROCUREMENT SPECIALIST FOR APPEAL FILING INSTRUCTIONS.

SPECIFICATION OR BID APPEALS RECEIVED LATER THAN FIVE (5) WORKING DAYS PRIOR TO BID OPENING OR WITHOUT SUFFICIENT DETAILS **WILL NOT BE CONSIDERED.**

NOTICE!

AN APPEAL FEE (CHECK OR MONEY ORDER) THAT IS 1% OF THE ESTIMATED DOLLAR AMOUNT OF THIS CONTRACT IS REQUIRED WITH A BID SPECIFICATION APPEAL.

THIS FEE IS A PREREQUISITE FOR PURSUING THE APPEAL AND MUST ACCOMPANY THE APPEAL. THE APPEAL FEE WILL BE RETURNED IF THE APPEAL IS WITHHELD.

CAUTION: A BID THAT DOES NOT FULLY COMPLY WITH ALL OF THE PROVISIONS, TERMS, AND CONDITIONS OF THIS OR ANY ACCOMPANYING SPECIFICATION AND BID, MAY BE DETERMINED AS A COUNTEROFFER AND MAY RESULT IN THE BID BEING REJECTED FOR NON-RESPONSIVENESS.

- I. **GENERAL:** It is the intent of this specification to describe the basic requirements for a Natural Gas Generator Set, QTY: (1) - 125kW outdoor unit w/sound attenuated enclosure. This equipment will be purchased by the City of Milwaukee DPW Special Electrical Services. This system will be used for standby power to provide sufficient electrical power at the Milwaukee

Police Station District 5. The Successful Bidder is required to deliver and set the unit on a concrete pad located at the facility. The City of Milwaukee will be responsible for the installation of the concrete base pads and all work associated with any electrical and natural gas hook ups. These specifications cover the general requirements as to the type of construction and tests to which the equipment shall conform, together with certain details as to finish, equipment, and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the manufacturer who shall be solely responsible for the design and construction. All parts, items, or features not specifically mentioned, which are necessary or which are regularly furnished in order to provide a complete integrated Natural Gas Generator System, shall be furnished by the manufacturer and/or bidder at the bid price.

- II. MANUFACTURER'S WARRANTY: The successful bidder will be required to furnish a warranty by the manufacturer that the equipment and all of the component parts bid are of merchantable quality and suitable for the service intended by the buyer. Specific warranty requirements are as follows:
- A. ELECTRIC POWER GENERATION PRODUCT: The Natural Gas Generator Set(s) shall be warranted (100% parts and Labor) for a period of 24 months when used in a standby application not exceeding 500 hours per annum from the date of startup and acceptance by the bidder.
 - B. WARRANTY REPAIRS: Under this provision, the successful bidder is totally responsible for handling and rectifying all warranty claims and repairs related to this purchase including any other equipment not of their manufacture and are responsible for all transportation costs related to the warranty repair.
 - C. REPAIR RECORDS: The successful bidder shall keep records on all incidences of repairs made to this equipment from date of startup and acceptance by DPW Special Electrical Services through the entire warranty period. These records (work orders) shall provide details on what needed to be repaired and the corrective action taken. Copies of all work orders shall be forwarded to DPW-Special Electrical Services within 10 days of the completion of said repairs.
 - D. WARRANTY STATEMENT: Bidder **must** include a complete warranty statement confirming the above and any other applicable warranties with the bid or within three working days of receiving a request.

NOTE: IF NOT PROVIDED WITH THE BID, BUT REQUESTED BY THE DOA, BUSINESS OPERATIONS DIVISION, PROCUREMENT SERVICES SECTION, THE COMPLETE WARRANTY STATEMENT MUST BE SUBMITTED WITHIN THREE (3) WORKING DAYS OF RECEIVING A REQUEST OR THE BID WILL BE REJECTED.

III. REPAIR/SERVICE PARTS:

- A. REPAIR PARTS: Bidder shall have under his/her control a substantial stock of repair/service parts suitable for use on the Natural Gas Generator Set in order to render prompt service and/or parts replacement. The bidder **should** state in their bid where these parts are stored and how long it will take to deliver repair parts to the City of Milwaukee.

NOTE: IF NOT PROVIDED WITH THE BID, BUT REQUESTED BY THE DOA, BUSINESS OPERATIONS DIVISION, PROCUREMENT SERVICES SECTION, THE INFORMATION ON REPAIR PARTS MUST BE SUBMITTED WITHIN THREE (3) WORKING DAYS OF RECEIVING A REQUEST OR THE BID WILL BE REJECTED.

IV. AWARD AUTHORITY:

- A. The City Purchasing Director shall be the sole judge of the quality and suitability of the equipment, materials and/or services in its determination of the successful bidder for all bids.

- V. DESCRIPTION: DESCRIPTIVE LITERATURE DESCRIBING THE PARTICULAR EQUIPMENT (make, model and manufacturer's rating) SHOULD BE INCLUDED WITH THE BID. An itemized listing of the deliverables with commissioning and start-up services for each kilowatt size generator system.

NOTE: IF NOT PROVIDED WITH THE BID, BUT REQUESTED BY THE DOA, BUSINESS OPERATIONS DIVISION, PROCUREMENT SERVICES SECTION, THE DESCRIPTIVE LITERATURE MUST BE SUBMITTED WITHIN THREE (3) WORKING DAYS OF RECEIVING A REQUEST OR THE BID WILL BE REJECTED.

However, this will not preclude the manufacturer from making alterations or changes as necessary to make this equipment more suitable for the purpose intended. All such changes from his regular manufacturer shall be stated in the bid, or in a letter accompanying it.

- VI. INTERCHANGEABILITY: All similar equipment purchased under one contract shall have interchangeable component parts.
- VII. LATEST MODEL: Bidder shall bid on the latest model of this type of equipment manufactured by his company. The manufacturer shall have printed literature and brochures describing the standard series specified not a one of a kind fabrication.
- VIII. OEM REQUIREMENTS: The system shall be supplied by an original equipment manufacturer (OEM) who has been regularly engaged in the production of engine-alternator sets, automatic transfer switches, and associated controls for a minimum of 25years, thereby identifying one source of supply and responsibility. Approved suppliers are listed below:
- IX. BRAND NAMES:
- A. REFERENCES: If articles have been identified in the bid by a "Brand Name" and model number, such reference is intended to be descriptive but not restrictive. It is for the sole purpose of indicating to the prospective bidders a description of articles that will be satisfactory. Other items of equal quality will be considered. Samples and/or demonstrations may be requested.
 - B. SUBSTITUTIONS: Unless the bidder clearly indicates in his bid that he is offering a different article, his bid shall be considered as an offering of the brand name article.
 - C. Acceptable Manufactures
 - 1. Cummins/Onan
 - 2. Kohler Power Systems
 - 3. Caterpillar/Olympian
 - 4. MTU/Detroit Diesel
 - 5. Generac
- X. TECHNICAL REQUIREMENTS: All features below shall be incorporated in the equipment and all items furnished and installed into a complete unit ready for operation.
- A. EQUIPMENT DESCRIPTION:

QTY: (1) Generator Set Rated for 125 kW Standby, at ≥ 1800 RPM, 60Hz, **120/208 VAC, 3phase, 4wire**. Engine and Generator rated for outdoor installation in sound attenuated enclosure w/ access doors. Inclusive of the following: Part B

B. ENGINE: The engine shall be a Natural Gas Engine, 4-stroke-cycle natural aspiration, spark ignited. It will have adequate horsepower to achieve rated KW output. **The engine shall support a 100% load step.**

- AIR INLET SYSTEM: Air Cleaner; single element canister type with service indicator.
- FUEL SYSTEM: **Natural gas fuel system.**
 - The engine shall be configured to operate on pipe line grade natural gas. Inlet pressures and flow rates must be supplied for each unit size (kw) with the bid.
 - The engine shall utilize a fuel system inclusive of carburetor, gas regulator, low gas pressure switch, and fuel shut-off solenoid.
 - The engines internal fuel connections shall be terminated to the generator frame via an NPT fitting for easy installation.
- EXHAUST SYSTEM: Critical grade internal silencer system. The engine exhaust emissions shall meet the EPA emission requirements for standby power generation.
- GOVERNING SYSTEM: Electronic isochronous governor. Engine speed shall be controlled with an integrated isochronous governor function with no change in alternator frequency from no load to full load. Steady state regulation is to be 0.25%. All engine sensor connections shall be sealed to prevent corrosion and improve reliability.
- COOLING SYSTEM:
 - Radiator and cooling fan complete with protective guards.

- Thermostatically controlled water jacket heater(s) to aid in quick starting.
 - Standard ambient temperatures up to 122F (50 degrees C).
 - High coolant temperature/low coolant level shutdown.
 - Coolant fill box providing a visual means to determine adequate coolant level. (sight glass)
 - Low coolant temperature alarm.
 - 50 % glycol/water mixture.
 - 1500 watt, jacket water heater, 120 volt AC.
 - All cooling system hoses shall be silicon or EPDM with constant torque hose clamps.
 - Radiator drain extensions/shut off valves easily accessible.
 - Radiator fan guard must be installed for personnel safety that meets UL and OSHA safety requirements.
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- STARTING/CHARGING SYSYTEM:
 - 12 volt starting motor. Solenoid shift, DC starting system
 - Base mounted batteries 110 AH, (shipped dry) with cables (shipped loose). Sized per the manufacturer's recommendations
 - Batteries shall be lead acid shall meet NFPA 110 cranking requirements of 90 seconds of total crank time.
 - Battery specifications (type, amp-hour rating, cold cranking amps) to be provided in the submittal.
 - Engine driven battery charging alternator with integrated voltage regulation
 - UL listed 10-amp battery charger float equalize
 - Charging current to be monitored within the generator controller to support remote monitoring and diagnostics
 - Battery heater blanket 110 volt, 75 watt, thermostatically controlled to 80 degrees F.
 - Battery to be mounted and filled at startup by vendor.
 - Battery Tray
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- LUBE SYSTEM:
 - Lubricating oil – initial fill
 - Oil filter, filler and dipstick.
 - Oil drains lines with valve; piped to edge of base.

- Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have a replaceable oil filter(s) with internal bypass and replaceable element(s).

C. GENERATOR: The generator system shall support generator start-up and load transfer within 10 seconds. The generator shall accept a load step of 100% if rated KW within a maximum frequency dip of 12Hz.

- GENERATOR AND GENERATOR ATTACHMENTS:

- **Qty:(1)-3phase, 4wire,120/208 VAC, 125 Kilowatts**
- Automatic voltage regulator
- 600AF/400AT mainline circuit breaker, UL-80% for 125Kw
- The generator shall be a 4-pole, revolving field, stationary armature, sealed bearings, synchronous machine. The excitation system shall utilize a brushless exciter with a three phase full wave rectifier assembly protected against abnormal transient conditions by a surge protector. Photo-sensitive components will not be permitted in the rotating exciter.
- The generator shall include a permanent magnet generator (PMG) for excitation support. The system shall supply a minimum short circuit support current of 300% of the rating (250% for 50Hz operation) for 10 seconds.
- Three phase generator shall be 12 lead, broad range capable of supporting voltage reconnection. Single phase alternators shall be four lead and dedicated voltage designs (600v) shall be six lead. All leads must be extended into a NEMA 12 connection box for easy termination. A fully rated, isolated neutral connection must be included by the generator set manufacturer.
- The generator shall use a single, sealed bearing design. The rotor shall be connected to the engine flywheel using flexible drive disks. The stator shall be direct connected to the engine to ensure permanent alignment. For generators connected to gear reduction units utilized on engines operating at speeds greater than 1800 rpm, direct connection of the alternator to the engine is not required.
- The generator shall meet temperature rise standards of UL2200 (120 degrees C). The insulation system material shall be class "H" capable of withstanding 150 degrees C

temperature rise.

- The generator shall be protected against overloads and short circuit conditions by advanced control panel protective functions. The control panel is to provide a time current algorithm that protects the generator against short circuits. To ensure precision protection and repeatable trip characteristics, these functions must be implemented electronically in the generator control panel -- thermal magnetic breaker implementation are not acceptable.
- A generator strip heater shall be installed to prevent moisture condensation from forming on the alternator windings. Anti-condensation heater, 120 volt.
- A tropical coating shall also be applied to the alternator windings to provide additional protection against the entrance of moisture.
- CONTROL SYSTEM:
 - H100 Control Panel or equivalent Temp Range -40 to 70 degrees C. The generator control system shall be a fully integrated microprocessor based control system for standby emergency engine generators meeting all requirements of NFPA 99 and 110 level 1. The generator control system shall be a fully integrated control system enabling remote diagnostics and easy building management integration of all generator functions. The generator controller shall provide integrated and digital control over all generator functions including: engine protection, alternator protection, speed governing, voltage regulation, air-fuel-ratio control (as required) and all related generator operations.
 - The generator controller must also provide seamless digital integration with the engine's electronic engine control module (ECM) if so equipped. Generator controller's that utilize separate voltage regulators and speed governors or do not provide seamless integration with the engine management system are considered less desirable.
- a) LCD Displayed Items via two four-line displays.
 - Voltage (all phases)
 - Power factor

- kVAR
- Engine speed
- Battery voltage
- Run hours
- Fault history (alarm log)
- Coolant temperature
- Not in auto position (flashing light)
- Current (all phases)
- kW
- Transfer switch status(normal/generator)
- Low fuel pressure
- Service reminders
- Oil pressure
- Time and date
- Exercise speed

b) SHUTDOWNS:

- Over/Under voltage
- Over/Under frequency
- Over speed
- Over crank
- Low oil pressure
- High coolant temperature
- High Temperature warning prior to shutdown
- Low coolant level

c) INTERNAL FUNCTIONS:

- I²T function for alternator protection from line to neutral and line to line short circuits
- Built-in PLC for special applications
- Configurable for NFPA 110, Level 1 or 2
- Emergency stop
- On/ Off Auto Switch
- Not in Auto flashing light
- Audible alarm for fault condition
- Programmable auto crank function
- 2-wire start for any transfer switch
- Built-in 7 day exerciser programmable

- Adjustable engine speed at exerciser
 - 120V GFCI Convenience Outlet
 - RS232 port for GenLink Control
 - RS485 port for remote communication
 - Cat. 5/6 communication connection
 - Canbus addressable
 - Governor controller and voltage regulator built into the master control board
 - Alarm and event logging
 - Auxiliary contacts (dry) for remote fault indication
 - Volt-free(dry) contact for Generator Set Running
 - Terminals for remote emergency stop
 - Built-in diagnostics
 - Engine sensors are 4-20 mA for minimal interference (shielded wire)
 - Water proof connections
 - Temperature range – 40 °C to 70 °C
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- MOUNTING SYSTEM:
 - Formed steel skid base/ Galvanized
 - Linear vibration isolators between base frame and engine-generator/alternator.
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- Enclosures:
 - Outdoor Rated Sound Attenuated Enclosure with internally mounted silencer. Enclosure shall use zinc plated or stainless steel fasteners. Stainless steel locks and hinges. Enclosure dimension shall be approximately 154" L x 41" W x 64" H. Side access door swing shall be 32.5 inches. Front access door swing shall be 36.2 inches.
 - The enclosure shall be completely lined with sound deadening material. This material must be of a self extinguishing design.
 - The enclosure shall be made of steel with a minimum thickness of 14 gauge. The enclosure is to have hinged, removable doors to allow access to the engine, alternator and control panel. The hinges shall allow for door fit adjustment. Hinges and all exposed fasteners will be stainless steel or JS5000. The use of pop-rivets weakens the paint system and

not allowed on external painted surfaces. Each door will have lockable hardware with identical keys.

- The enclosure shall be coated with electrostatic applied powder paint, baked and finished to manufacturer's specifications. The color will be manufacturer's standard.
- The enclosure shall utilize an upward discharging radiator hood. Due to concerns relative to radiator damage, circulating exhaust, and prevailing winds, equipment without a radiator discharge hood will not be acceptable.
- The genset silencer shall be mounted within the discharge hood of the enclosure. **Due to architectural concerns, silencers mounted on the top of the generator enclosure are not acceptable.** Gensets with silencers mounted inside the main generator compartment are acceptable only if the silencer is thermally wrapped to minimize heat stress on the surrounding components.
- DECIBEL LEVEL: Enclosure shall limit the dba reading at 2300 rpm as follows:
 - 67 dBA at 23 feet in a free field environment Full Load
- LOOSE ITEMS: Supplier to itemize loose parts that require site mounting and installation. Preference will be shown for gensets that factory mount items like mufflers, battery chargers, etc.
 - Flexible fuel hose for use in gas piping installation.
 - Spare Parts:
 - Fuses: One spare set
 - Filters One spare set (air, fuel, oil)
- AUTOMATIC TRANSFER SWITCH: QTY: (1) 400/600 Amp Automatic Transfer Switch with MEXE package and NEMA 1 enclosure. Asco acceptable. Each Transfer Switch shall be open transition. Current/voltage rating to be matched with genset output.

NOTE: Transfer switches must be capable of event logging up to 16 events that track time, date, reason and action taken.

- Utility voltage sensing controls
- Drop-out and pick-up
- Utility interrupt delay
- Min. Standby voltage
- Min. standby frequency
- Engine warm up
- In phase monitor
- Time delay neutral
- Return to utility
- Front Panel LED position status
Normal (Utility) and Generator
- Source available indication
- Engine cool down
- Exerciser(programmable scheduler) with or w/out load
- Signal B4 transfer contacts
- UL1008 listed
- CSA Certified
- 5year extended warranty
- Single set of auxiliary contacts
- 2-wire engine start circuit

XII. SUPPORT: Bidder shall provide DPW Special Electrical Services with sufficient technical support at no charge during the installation period and up until the Natural Gas Generator Units are tested and accepted by the City of Milwaukee.

XIII. PREBUILD MEETING: A prebuild meeting shall take place between the DPW Special Electrical Services and the winning bidder Project Manager prior to units being ordered.

XIV. START UP: Vendor shall include the cost for one day of start up service for each of the Natural Gas Generators in their unit price and shall at a minimum include the following:

- System set up
- Unloading and setting of equipment on City of Milwaukee prepared concrete pad.
- General installation, piping, & wiring overview with DPW Special Electrical Services personnel.

- Final testing (**2 hour duration load bank testing utilizing actual facility loads**), to include portable load bank to supplement building loads if not sufficient.
- The supplier of the electric generating systems and associated items covered herein shall provide a factory trained technician(s) to check out the completed installation and to perform an initial startup inspection to include:
 - a) Ensuring the engine starts (both hot and cold) within the specified time.
 - b) Verification of engine parameters within specification.
 - c) Verify no load frequency and voltage, adjusting if required.
 - d) Test all automatic shutdowns of the engine-generator.
 - e) Perform a load test of the electric plant; ensuring full load frequency and voltage are within specification by using building load.
 - f) Set-up automatic exerciser via transfer-switch initiation.
 - g) Produce certified documentation of the testing.
- System demonstration and training to include gen set and transfer switch panel operations. Minimum of two (2) hour training time. Training is to be supplied by the start-up technician for the end-user during commissioning. The training should cover basic generator operation and common generator issues that can be managed by the end-user.

NOTE: Vendor will be notified by DPW Special Electrical Services when these tests can be performed followed by customer training.

XV. OPERATORS/PARTS/SHOP MANUAL:

- A. OPERATIONAL INSTRUCTION BOOKS: Two (2) instruction books per/unit shall be provided. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.
- B. MANUALS: One (1) complete shop manual including information on engine-generator sets and control inclusive of the automatic transfer switch shall be provided. In addition an electrical interconnection schematic and a general dimension drawing for the Generator

equipment bid shall also be provided for each unit. On multiple orders, vendors are required to furnish two (2) set of shop manuals, engine generator manuals, wiring schematics and drawings per unit.

- C. MAINTENANCE MANUALS: One complete set of Manufacturer's recommended maintenance and service intervals.
- XVI. WARRANTY: Relevant to Section II. The standby electric generating system components, complete genset and instrumentation panel shall be warranted by the manufacturer against defective materials and factory workmanship for a period of five (5) years. Such defective parts shall be repaired or replaced at the manufacturer's option, free of charge for parts, labor and travel. **The warranty period shall commence when the standby power system is first placed into service and accepted by the end user representative.** Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. Also, in the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must have the necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.
- XVII. OPTIONS:
- Provide pricing for a five year extended warranty. Include list of items that are covered under the extended warranty. Include list of recommended spare parts on hand for each system.
- XVIII. MISCELLANEOUS:
- A. RESPONSIBILITY OF BIDDERS: Bids will not be considered from firms which are not in sound financial condition, or which do not have adequate facilities or sufficient experience for supplying the equipment specified.
- XIX. BID SUBMITTAL (IMPORTANT): In addition to submitting a bid on the forms provided by the City, the warranty statement, parts/service facility, and descriptive literature, bidders **should** submit a detailed breakdown of what is being supplied (an itemized list of equipment/and functions.). This detailed breakdown shall follow the same sequence as the items listed in this specification under the paragraph entitled "Technical Requirements," and shall provide sufficient information so that confirmation of specification compliance can be easily determined.

The detailed submittal should include:

- Proposed Equipment
- Engine Generator Specification Sheet
- Bill of Materials
- Transfer Switch Specification Sheet
- Controls Specification sheet(s)
- Stub Up Locations for Gas Connections and Electrical Hookups
Installation/ Layout dimensional drawings
- Wiring schematics
- Sound data
- Emissions certification
- Warranty statement
- Equipment Lead Time

NOTE: IF NOT PROVIDED WITH THE BID, BUT REQUESTED BY THE DOA, BUSINESS OPERATIONS DIVISION, PROCUREMENT SERVICES SECTION, THE DETAILED BREAKDOWN MUST BE FURNISHED WITHIN THREE (3) WORKING DAYS OF RECEIVING A REQUEST OR THE BID WILL BE REJECTED.

XX. DELIVERY: Due to the location of the concrete pad provided for the engine-generator sets, bidder/contractor is required to use specialized equipment to unload and place the generator set. This is to be coordinated with City of Milwaukee-Special Electrical Services near time of delivery.

Bidder/Contractor shall, therefore, be responsible for determining all conditions affecting delivery and shall include all costs associated with the use of specialized equipment to unload and set the generators in their unit price.

XXI. FACTORY ACCEPTANCE: DPW Special Electrical Services reserves the right to factory witness test generator system equipment at rated load for 30 minutes prior to shipment from Manufacturer's Facility. Verify voltage & frequency stability. Verify transient voltage & frequency dip response.

XXII. SERVICE: Manufacturer's authorized service representative shall meet the following criteria:

- Certified, factory trained, industrial generator technicians'
- Service support 24/7, 365
- Service location within 200miles
- Response time of 4hours on site
- Response call within 1 hours

- Service and repair parts in-stock at performance level of 95%
- Offer optional remote monitoring and diagnostic capabilities
- Offer Service Contracts that are available
- Delegation of service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications